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ABSTRACT

The author gives an interpretation of the environment of the independent researcher and reasons for considering the academic environment as important to basic and applied research. Suggestions for obtaining support for independent research are presented. Balance between basic and applied research in the university environment is urged, as are moderation and patience in the expectation of solutions for educational problems emerging from such research. (MJB)

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THE INDEPENDENT RESEARCHER

RIR-77-10

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THE INDEPENDENT RESEARCHER

In my initial discussions with the sponsors of this conference I expressed some reluctance in agreeing to come forward with a paper concerned with those aspects of educational research held close to the heart of the independent researcher. In this day of big business, big government, master plans, scenarios, linkages, program budgets, network analysis, and flow charts of administrative systems which would even defy the logical analysis of the most sophisticated computer analyst, the position of the independent researcher in the systems of education is indeed becoming a minor one. However, I was informed that I could provide some insights, from the point of view of an independent researcher, into the strategies which might be successful in getting support for research projects. Even though my last grant request has not been successful, I am prepared to give you some opinions in a forth-right manner concerning strategies for support of research, and some biased opinions on the directions in which we should be moving.

Before moving towards a statement about the strategies which might be successfully employed by the independent researcher to obtain funding for his projects, I feel that it is necessary to state clearly the environment in which I have cast the independent researcher. Specifically, I am referring to the university environment, since I know of no educational system which can afford to have an independent researcher in the same sense as for example, might be found in such companies as IBM, or Bell Telephone. Within the university environment there are a number of obligations which exist either because of specific design or because of the collective history of the various faculties and departments.

Clearly, there is an obligation to teach. Classes must be met. This is of considerable importance as suggested by the fact that a timetable and budget is provided for this purpose. A second obligation is to carryout research to add to the basic pool of knowledge in one's own discipline. In addition to these two main obligations which I perceive as being important in varying order to different groups within the university, there is a varying commitment to provide service to the professional community, and to the administrative functions required for instruction and research.

Clearly, faculties of education in most universities must devote a considerable amount of their energies to the training of teachers. In the case of some universities, this obligation is made to appear almost as a command by government legislation. If commanding legislation is not present, the acceptance of the obligation is energized by the recognition that some ministers of education can, by the stroke of their pens, create a teacher. The importance of this power is suggested by contrast when one considers that other ministers of the crown have not yet dared to create a lawyer, doctor, dentist, or an engineer in the same manner.

We moved from the normal school to the university, a move which required us to embrace, as best we could, the obligations of the university community with regards to research through a conscious desire to increase our credibility, as well as to do a better job of training teachers. Since education has been a late-comer into the university, it brought with it a depression mentality with regards to budgets, so that educational research has never established its importance as an activity well identified within the university budget. To some lesser extent this might be said of other social sciences, but considerably

less so for the humanities, the physical sciences, and the medical sciences. In many instances, we have had to ride the coattails of others to gain access to resources.

The university environment by its history, and collective desire is not a public agency designed to be a contracting agency for purposes of government sponsored research. The design was set to a considerable extent before faculties of education appeared within the university structure. However, because we were late-comers, and therefore behind in establishing a strong commitment for research, -- a commitment which cannot now be enhanced because of restrictions of funding, the susceptability of seduction by contracts is markedly increased.

Setting aside the obligation for the training of teachers, let me suggest to you that there is an important reason for faculties of education to operate within the context of the university. This reason is as important for the training of teachers as it is for educational research. We have heard more and more frequently that the future of a country is limited if it has less and less access to energy resources. Indeed, it is true that with large amounts of energy one can obtain access to mineral ores which currently are too expensive to mine. Because our society has been historically oriented towards the production of tangible products, frequently by brute force, we have forgotten that <u>ideas</u> are behind all our productive efforts and <u>that only people can create ideas</u>. Systems of organization, such as a university, can only increase the probability that ideas will come forward. There is no guarantee, i.e., a probability of I.O., that even the university system will produce the ideas so necessary to solve our problems. I would strongly argue that although the government as a representative of some publics, is prepared to allow greater funds to flow towards increasing

the probabilistic event of finding more oil, it does not appear to be as interested in capitalizing on the probabilistic event of creating ideas to help us solve problems in education.

Perhaps I am too harsh in my intrepretation of the public's willingness to take risks in order to capitalize on creating ideas, for some bureaucrats believe that a master plan is all that is needed. I am not suggesting that planning is not necessary, but I am suggesting that plans must recognize the probabilistic nature of idea-creation. If you ask me to create a tree, specifying where each branch must be, its size and shape, this I cannot do, for you would be asking me to be God. Not even a minister or civil servant can take God's role. But, I can grow you a tree, I can prune the poor and unproductive branches, I can graft different varieties into the trunk where no branches exist. But I cannot create you a tree. Plans must have a component of growth and evolution.

I believe that one must recognize the environment in which the independent researcher is operating, and be prepared to capitalize on the probabilistic events of important ideas being created. This position is not generally compatible with the needs of government, who by their offering of contracts are prepared to buy specific information geared to their perceived political needs. A government may be in power for a short period of time, but a research program required for the production of ideas which will have a lasting effect upon education and instruction may take ten to twenty years to develop. The relatively short term desires, particularly in the light of scheduled elections, is not supportive of long term research aimed at the production of ideas.

The independent researcher must decide in which area he wishes to play; he may lean towards a lengthy research program for the creation of new ideas at one extreme, or at the other extreme, initiate a private

business and carryout short term research in much the same manner as any other transaction involving a fee for service. The enticement of contract research sponsored by government agencies, can become most attractive when university stature and faculty tenure and promotion is decided more by how much money is brought in, than for what purpose it is brought in, and whether it fits the long range goal of producing critically important ideas to help solve world problems. I am not suggesting that all university researchers should concentrate their efforts on basic research at the expense of applied work for not all researchers by training and desire can participate effectively. I am suggesting that independent researchers wish to preserve the right to decide into which domain they will venture, or at least to what extent they operate in both domains.

Given the interpretation of the environment of the independent researcher, and the reasons why I think the academic environment is important, let me get to the problem of expressing my opinions on obtaining support for independent research. In the points I wish to make, I will be drawing upon my experience in appraising grants for such agencies as the National Research Council, Canada Council, the Medical Research Council, and private foundations.

1. Know the objectives of the funding agency to which you propose to send your proposal. At most universities a research grants and contract office can provide the basic guidelines. If there is a possibility that your project does not fit clearly into a defined area of support, write the agency directly and explore with them their interest in support of your research.

2. Explore ideas with your colleagues, and if the research involves the support of outside institutions, indicate the extent of cooperation which might be forthcoming from such institutions.

3. The researcher must recognize the proposal, generally prepared in the format defined by the granting agency, is the primary vehicle by which he will be allowed to communicate his research plan. With many agencies, regardless of how restrictive you may feel about this approach, it is the basis for much of the final decision.

a) Follow the directions honestly and accurately, keeping in mind that your proposal may be sent, without your knowledge, to someone who is very familiar with your work.

b) Cover the relevant background research. Rather than omitting important research because you disagree with it, recognize its existence in a critical manner.

c) Be precise and clear in your description of what you plan to do. When the research decisions are sequential and where conditions cannot be accurately estimated, be sure to note these as well as alternatives which will be considered.

d) Where research directions and procedures are not clearly definable, pilot test your procedures.

e) Keeping in mind that in most cases you have one chance to convince the granting agency of the merit of your proposal, the research design must be appropriate and clearly stated. The validity of the measures, samples, and controls must be clearly evident to the reviewers. It is highly desirable that some recognition be given to avoid collecting random numbers particularly with special measuring instruments you design yourself.

f) Above all, speculate about your results in two directions. First consider what will be said if all your results do in fact turn out to be in the desired direction. Are there alternative explanations for such results? This is important in those research studies which must work within existing conditions, such as in the schools.

Of equal importance, speculate as to what you will report if your results are not in the desired direction, or essentially negative. Traditionally, this forms the basis of the thesis chapter entitled, "Summary and Suggestions for Further Research," which is frequently more correctly identified as the "Excuses" chapter. Try to identify the reasons for negative results, and correct them before the research is started. More generally, consider as many competing explanations of your results as you can.

g) Make some reasonable extimates of the amount of data which will be collected, and the amount of time it will take to collect, and the amount of time it will take to analyze. Unfortunately, because many researchers in education have come through graduate programs where knowledge about computer processing is not considered important, they propose to collect extremely large amounts of data and justify the collection by naively indicating that it will be computer analyzed - a magical process. If storage and manipulation of large amounts of data are to be handled by recognized data management systems, evidence should be given that the researcher will have access to such systems, and has anticipated the cost of entering and using such systems.

h) The analysis should be described in a clear and concise manner with an indication as to the nature of variables which will enter each specific analysis. The statement that data will be analyzed by the appripriate statistical methods does not inspire the reviewers with any large amount of confidence, and should be avoided. In addition, the specification of a method of analysis through referencing the name of a computer program should be avoided, because reviewers wish to know the method of analysis and not your willingness to accept some unidentified programmer's interpretation of the arithmetic computations. Sometimes I shudder to think of the number of programs which contain subtle errors, and which will give incorrect results without the researcher recognizing what has happened. It may surprise many researchers, and consumers of research, that there are no standards for the development and testing of computer programs we use.

i) Give some indication that you are aware of the problem of data errors due to recording of results and their transcription to data processing formats. Although there are no perfect checks which can be devised in all cases, where possible even random checking is more desirable than none at all.

j) With the easy access to computers, I sense that many researchers have moved away from an understanding of the basic statistical models which the computer has applied to the data. Many times we are "killing" ants with "A" bombs. The researcher must be careful to avoid capitalizing on statistical artifacts of the procedures used.

k) Be honest in the assessment of the budget requirements, and resist being placed into the unethical position of obtaining money for one purpose in order to support other activities which more rightly belong to your institution. An underestimate is as disconcerting to a reviewer as an overestimate.

I have mentioned a fairly large number of points which the researcher must consider. These considerations cannot be carried out effectively by allocating the activity to a weekend. Allow the proposal to sit for a couple of weeks, then go back and re-examine it for clarity.

One final point which causes some researchers and granting agencies considerable problems. Make sure you are fully aware of the policies and regulations under which your institution will allow you to accept the research grant. If you disagree with the regulations, fight them as a staff member. Your attempt to involve the granting agency in your fight is a poor strategy.

The points which I have noted apply most appropriately when the independent researcher is, in a sense, trying to convince someone else to support the researching of his own ideas. There will be the occasion when a researcher wishes to take on a contract from some agency. On the basis of limited experience in observing some problems which develop in this kind of agreement, I would offer the following advice:

1) Know exactly what kind of agreement you are getting into, specifically with regard to the following:

   *What services are you to provide within the terms of the contract?

   *What flexibility do you have, and what reporting procedures must you follow with regards to the budget?

   *What will the nature be of the final report? Your expectations and that of the contracting agency might be quite different.

   *Will you and the contracting agency know when the contract has been completed?

   *If an external evaluator is to be brought in by the contracting agency, who will the evaluator be and does the external evaluator perceive the same important factors forming the basis of the evaluation as you do?

2) If your contract is one of evaluating someone else's project, then be sure you know to whom the report is to go.

3) Clarify with the contracting agency your rights to publish your report, and if the report is one which must be kept confidential, check the regulations of your own institution to determine whether secret work can be done on your campus.

4) Can you honestly say that you are not competing with an outside private research agency?

I would like to conclude my remarks by saying that although the independent researcher may be working in an academic environment, this is not to suggest that his only interest is esoteric, cloud-nine research which has no practical application. The university, considered as a collective entity of many disciplines, must preserve the freedom for

those who wish to work on basic research problems. But the same environment must also allow researchers to work on applied problems. A delicate and continuous balance must be maintained between these two interests. Of special concern to the university must be the over reaction to obtaining funds on the basis of contracts which distort its teaching activities, and undermines its financial stability.

In education a special balance must be struck between the need to solve immediate problems and the need to provide the basis for long range solutions. The resolution of immediate problems based upon an existing, reliable, and a valid body of knowledge about instructional processes, may not be possible. I would estimate that it takes about ten years of work at our current level of development to produce the equivalent of one educational solution to an applied problem. This is in marked contrast to the rapid developments as observed in, for example, micro-miniaturization of electronic circuits. The knowledge which provides the basis for this latter rapid development was made many years ago.

The public and governments expect to obtain rapid answers to problems which plague education. I believe they are taking the position that if the academic researcher cannot provide the answer, then the information can be purchased from another source. Short term solutions (information) may be purchased, but I doubt very much that long term solutions can be purchased. My reasons are as follows:

1) We cannot as yet build on the shoulders of giants in the same sense as can the physical sciences with Newton, Galton, Rutherford, and Einstein.

2) We do not have the validity, reliability, or reproducability in our research which is required for long term solutions.

3) We have competing theories, and only a very limited number of unifying concepts.

These points do not necessarily reflect inadequate attempts on the part of researchers. They may well reflect the basic nature of the area in which we work, i.e., we are most intimately concerned with human endeavors. In fact, where we do find some amounts of stability, such as in the area of test theory, evaluation, and measurement, we find ourselves moving away from real individual students, to groups of students, or to hypothetical students which produce hypothetical distributions.

I am sure that those of you who have been concerned with attempting to find some degree of stability in the results of educational research, have wondered whether some of today's problems will ever be resolved. Perhaps, you have wondered that the best we can do is to keep educational problems to a tolerable level. This may well be true. I can only suggest in our world of weak and competing theories, and dynamic populations, that we may well have to initiate another mode of resolving, or at least examining, our problems. Our attempts to find immediate and long term solutions have been based upon taking "snap-shot" pictures of highly dynamic and complex phenomena. This approach is like holding up a picture of a runner, and attempting to claim in perpetuity that our picture is a faithful description of the real world. Of course, it might well happen, and by this mode we will never know for sure, that the runner dies an hour later of heart failure. The analogy suggests to me that what we might have to consider is a far more careful and continuous monitoring of our educational practices as they affect <u>real students</u> in <u>real classrooms</u>. We cannot wait ten years for the public to voice an alarm, and then to be calmed by the "snap-shot pictures" and static drawings developed by some royal commission on education.

I shall not push the need for monitoring very far, except to note that this monitoring must be at a speed which is more rapid than the

development of serious errors. It must be accurate, unobtrusive, and it must not degrade the educational process. It must provide the basis for solution of long range problems.

Although I have not given up trying to convince my colleagues what I believe to be the basis of such monitoring, I think it would be more judicious for you to reach your own conclusions.